AF/2837 IFW

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE HONORABLE BOARD OF PATENT APPEALS AND INTERFERENCES

In re the Application of

Taketo TAKEUCHI

On Appeal from Group: 2837

Application No.: 10/559,870

Examiner: R. MCCLOUD

Filed: December 7, 2005

Docket No.: 125195

For: CONTROL DEVICE FOR A VEHICLE MOTOR

APPEAL BRIEF TRANSMITTAL

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Attached is the Brief on Appeal in the above-identified application.

Also attached is Check No. 213540, in the amount of $540.00 ($270.00 Small Entity), in payment of the fee due under 37 C.F.R. 41.20(b)(2).

In the event of any underpayment or overpayment, please debit or credit Deposit Account No. 15-0461 as needed in order to effect proper filing of this Brief.

Respectfully submitted,

James A. Oliff
Registration No. 27,075

Scott M. Schulte
Registration No. 44,325

JAO:SMS/cdk

Date: December 23, 2008

OLIFF & BERRIDGE, PLC
P.O. Box 320850
Alexandria, Virginia 22320-4850
Telephone: (703) 836-6400

DEPOSIT ACCOUNT USE
AUTHORIZATION
Please grant any extension
necessary for entry;
Charge any fee due to our
Deposit Account No. 15-0461

12/24/2008 JADDO1 00000030 10559870
01 FC:1402 540.00 OP

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE HONORABLE BOARD OF PATENT APPEALS AND INTERFERENCES

In re the Application of

Taketo TAKEUCHI

Application No.: 10/559,870 Examiner: R. MCCLOUD

Filed: December 7, 2005 Docket No.: 125195

For: CONTROL DEVICE FOR A VEHICLE MOTOR

BRIEF ON APPEAL

Appeal from Group 2837

OLIFF & BERRIDGE, PLC
P.O. Box 320850
Alexandria, Virginia 22320-4850
Telephone: (703) 836-6400
Attorneys for Appellants

TABLE OF CONTENTS

I. REAL PARTY IN INTEREST

The real party in interest for this appeal and the present application is Aisin AW Co., Ltd., by way of an Assignment recorded in the U.S. Patent and Trademark Office at Reel 017363, Frame 0826.

II. RELATED APPEALS AND INTERFERENCES

There are no prior or pending appeals, interferences or judicial proceedings, known to Appellant, Appellant's representative, or the Assignee, that may be related to, or that will directly affect or be directly affected by or have a bearing upon, the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

Claims 1-16 are on appeal.

Claims 1-16 are pending.

Claims 1-16 are rejected.

No claims are allowed.

IV. STATUS OF AMENDMENTS

No Amendment After Final Rejection has been filed.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The invention of claim 1 is directed to a control device (Fig. 1) of a vehicle motor (motor 10, Fig. 1) with a plurality of coils (coils 11-13, Fig. 1, paragraph [0020]), comprising:

a temperature sensor (temperature sensors 11a-13a, Fig. 1, paragraph [0021]) that detects a temperature of each coil (each of 11, 12 and 13) of the plurality of coils (11-13), each coil (each of 11, 12 and 13) supplying an alternating current to a corresponding phase (U, V and W phase, paragraph [0020]) of the motor (10); and

a controller (control device 30, Fig. 1) that:

controls a torque of the vehicle motor (steps 102, 118 and 106, Fig. 2, paragraphs [0026] and [0033]);

detects a stalled state of a vehicle (step 104, Fig. 2, paragraph [0027]);

detects a current phase angle of the vehicle motor (step 110, Fig. 2 and all of Fig. 3, paragraph [0029]-[0031]); and

selects one detected temperature detected by the temperature sensor, which is based on a detected current phase angle (step 112, Fig. 2, paragraph [0031]), wherein:

the torque of the vehicle motor is reduced when the stalled state of the vehicle is detected (104:Yes) and when a selected temperature exceeds a restrictive temperature (T>Ts, steps 114-118, paragraph [0033]), and

the selected temperature is from a coil (11, 12 or 13) of the plurality of coils (11-13) where a maximum current flow is detected, with the maximum current flow being detected based on the detected current phase angle (all of Fig. 3 and paragraphs [0030] and [0031]).

The invention of claim 9 is directed to a method of operating a vehicle motor (motor 10, Fig. 1) with a plurality of coils (coils 11-13, Fig. 1, paragraph [0020]), comprising:

detecting a temperature of each coil of the plurality of coils (via temperature sensors 11a-13a for each of 11, 12 and 13, Fig. 1, paragraph [0021]), each coil supplying an alternating current to a corresponding phase (U, V and W phase, paragraph [0020]) of the motor (10);

controlling a torque of the vehicle motor (steps 102, 118 and 106, Fig. 2, paragraphs [0026] and [0033]);

detecting a stalled state of a vehicle (step 104, Fig. 2, paragraph [0027]);

detecting a current phase angle of the vehicle motor (step 110, Fig. 2 and all of Fig. 3, paragraph [0029]-[0031]); and

selecting one detected temperature based on a detected current phase angle (step 112, Fig. 2, paragraph [0031]), wherein:

the torque of the vehicle motor is reduced when the stalled state of the vehicle is detected (104:Yes) and when a selected temperature exceeds a restrictive temperature (T>Ts, steps 114-118, paragraph [0033]), and

the selected temperature is from a coil (11, 12 or 13) of the plurality of coils (11-13) where a maximum current flow is detected, with the maximum current flow being detected based on the detected current phase angle (all of Fig. 3 and paragraphs [0030] and [0031]).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The following grounds of rejection are presented for review:

1) Claims 1-16 are rejected as having been obvious under 35 U.S.C. §103(a) over Matsunaga et al. (Matsunaga), U.S. Patent No. 6,114,828, in view of Shimazaki et al. (Shimazaki), U.S. Patent Application Publication No. 2002/0116100.

VII. ARGUMENT

A. Claims 1 And 9 Are Not Obvious Over Matsunaga et al. (Matsunaga) In View Of Shimazaki et al. (Shimazaki), U.S. Patent Application Publication No. 2002/0116100

1. The References Fail To Use A Selected Temperature To Determine When Torque is Reduced

Claims 1 and 9 call for the torque of the vehicle motor to be reduced when the stalled state of the vehicle is detected and when a selected temperature exceeds a restrictive temperature (with the selected temperature being from a coil of the plurality of coils where a maximum current flow is detected).

Appellant asserts that the combination of Matsunaga and Shimazaki, when combined, fails to disclose or suggest each and every feature recited in independent claims 1 and 9. In summary, Matsunaga reduces torque if the motor does not rotate (that is, if the phase domain is the same) (col. 6, lines 22-54 and Fig. 2B, steps S33 and S37) and Shimazaki simply states that the drive current of the motor is reduced if the stalled state is determined based on the accelerator opening and the rotational speed of the motor.

a. Matsunaga Determines If The Motor Rotates To Determine When Torque Is Reduced

Matsunaga fails to disclose all of the features of claims 1 and 9 because Matsunaga reduces torque if the motor does not rotate. At step S31 of Fig. 2B, the controller 12 determines whether the present phase domain is the same (col. 6, lines 22-26). If the phase domain is the same, the output torque of the motor 5 is reduced by subtracting a displacement torque from a limitation torque (col. 6, lines 27-54 and Fig. 2B, steps S33 and S37) in order to avoid overheating. If the phase domain is not the same, then the output torque remains the same (col. 6, lines 55-59 and Fig. 2B, step 35).

Matsunaga thus fails to disclose reducing the torque of the vehicle motor when a selected temperature exceeds a restrictive temperature as called for by claims 1 and 9, but instead reduces torque if the phase domain remains the same.

Page 3 of the Office Action mailed April 10, 2008 ("Office Action") asserts that "Matsunaga discloses that the motor is stopped because it is in a locked state (Col. 2:8-33, col. 4:8-21) due to overheating (col. 6:49-55)." Appellant asserts that this assertion is not on point with Appellant's argument and reflects a misunderstanding of Matsunaga.

Matsunaga's col. 4, line 50 - col. 5, line 5 discusses how a locked state of the motor 5 is determined. Matsunaga fails to state that the motor is stopped because it is in a locked state due to overheating. Matsunaga instead attempts to avoid overheating (col. 6, lines 49-55 discusses the advantage of Matsunaga's invention). As previously discussed, Matsunaga determines if the phase domain is the same in order to determine whether the output torque of the motor 5 should be reduced in order to <u>avoid</u> overheating (col. 6, lines 27-59).

Regardless of the point to be made, even if Matsunaga disclosed that the motor is stopped because it is in a locked state due to overheating (which Appellant asserts that Matsunaga fails to disclose), Matsunaga fails to disclose or suggest reducing the torque of the vehicle motor <u>when a selected temperature exceeds a restrictive temperature</u> as called for by claims 1 and 9. As clearly illustrated by Matsunaga's Fig. 2B, Matsunaga reduces the output torque (S33 and S37) only if the limitation torque is less than the motor torque demand instruction value (S29:YES) and the phase domain is the same (S31:Yes). Matsunaga fails to consider determining if a selected temperature exceeds a restrictive temperature as called for by claims 1 and 9.

Page 2 of the Office Action admits that Matsunaga fails to disclose selecting a temperature from a coil of the plurality of coils where a maximum current flow is detected as called for by claims 1 and 9. In addition, Appellant asserts that Matsunaga also fails to

disclose reducing the torque of the motor vehicle <u>when a selected temperature exceeds a restrictive temperature</u> as called for by claims 1 and 9. Page 2 of the Office Action identifies Matsunaga's col. 6, lines 49-55 as disclosing this feature. However, Matsunaga's col. 6, lines 49-55 simply discusses the advantages that can be achieved by their invention (i.e., overheating) by changing phase domains if it is determined that a particular phase domain remains the same. Matsunaga fails to discuss a selected temperature or a restrictive temperature, and obviously fails to discuss comparing the temperatures to determine if torque should be reduced.

b. <u>Shimazaki Reduces Torque Based On An Accelerator Opening And Rotational Speed</u>

Shimazaki fails to overcome the deficiencies of Matsunaga because Shimazaki also fails to disclose reducing torque using a selected temperature. Shimazaki states that the stalled state is determined based on the accelerator opening and the rotational speed of the motor. After the stalled state is determined, Shimazaki simply states that the drive current of the motor is reduced. Shimazaki also fails to disclose or suggest reducing torque using temperature or when a selected temperature exceeds a restrictive temperature as called for by claims 1 and 9.

Appellant made this argument in a previous reply, and pages 3 and 4 of the Office Action asserted that "it is noted that the features upon which applicant relies (i.e., the motor is rotating) are not recited in the rejected claim(s)." Appellant asserts that the previous argument asserted has been misinterpreted. As previously argued, Shimazaki fails to disclose reducing torque using a selected temperature, as called for by claims 1 and 9, because Shimazaki states that the stalled state is determined (in order to determine whether the drive current of the motor should be reduced) based on the accelerator opening and the rotational speed of the motor. In other words, Shimazaki fails to disclose all of the features of claims 1

and 9 because Shimazaki discloses using another parameter (i.e., rotational speed). Appellant also asserts that all of the features relied upon are recited in claims 1 and 9.

c. **The References When Combined Are <u>Missing Features Recited In Claims 1 and 9</u>**

Therefore, neither reference discloses using a selected temperature as called for by claims 1 and 9. Taken as a whole, if Matsunaga were to be combined with Shimazaki (which Appellant does <u>not</u> admit would have been obvious), then the torque of the motor would be reduced when the motor does not rotate (as discussed by Matsunaga) and/or based on the accelerator opening and the rotational speed (as discussed by Shimazaki). Therefore, taken as a whole, Matsunaga and Shimazaki when combined fail to disclose or suggest using the parameter of a selected temperature that exceeds a restrictive temperature in order to reduce the torque of the vehicle motor as called for by claims 1 and 9. As a result, a claimed feature and function is missing even after the references are combined, and such feature and function in claims 1 and 9 would not otherwise have been known or obvious.

Pages 2 and 4 of the Office Action states that Shimazaki is being relied upon for the teaching that a maximum temperature comes from a maximum current. Appellant notes that Shimazaki fails to explicitly disclose this feature at the cited paragraphs [0015] and [0016].

In addition, even if Shimazaki disclosed this feature (which Appellant does not agree), Shimazaki suffers the same deficiency as Matsunaga in that Shimazaki also fails to determine if a selected temperature exceeds a restrictive temperature in order to determine if the torque of the vehicle motor is to be reduced. As discussed above, Shimazaki states that the stalled state is determined (in order to determine whether the drive current of the motor should be reduced) based on the accelerator opening and the rotational speed of the motor.

Furthermore, Shimazaki cannot select a temperature from a coil of the plurality of coils where a maximum current flow is detected, as called for by claims 1 and 9. In

Shimazaki, a temperature sensor is provided only in one phase armature coil (paragraph [0017], lines 2 and 3). As a result, Shimazaki cannot select a temperature from a coil of a plurality of coils.

2. Maximum Current and Maximum Temperature Is Misplaced

Pages 2 and 4 of the Office Action states that Shimazaki is being relied upon for the teaching that a maximum temperature comes from a maximum current. Appellant provides the following explanation in order to clarify maximum temperature and maximum current in order to explain why Shimazaki fails to suggest selecting a temperature from a coil of the plurality of coils where a maximum current flow is detected, as called for by claims 1 and 9.

Decidedly, a maximum temperature becomes the temperature of a phase where a maximum current flows in a steady state. However, the current flows intensively into a phase when in the stalled state. As a result, the phase where a maximum current flows should move to a new phase at that moment when the current phase reaches a maximum temperature in order to avoid limiting the torque of the motor. The temperature of the new phase where the maximum current now flows has not become a maximum temperature yet (the previous phase is the phase that is at a higher temperature). Therefore, the phase of maximum temperature definitely differs from the phase where maximum current flows based on the change of the phase, which flows the current in a transient state. See also Appellants Fig. 7 between times t2 and t3. The phase of the maximum temperature is the U-phase for most of this time period, even though the W-phase is the phase where the maximum current flows. The Office Action's reliance on Shimazaki in suggesting that a maximum temperature comes from a maximum current is not correct. Therefore, the Examiners' analysis or utilization of the prior art is erroneous (MPEP §2144.01).

Because claims 1 and 9 use the temperature of the coil where a maximum current flows instead of the maximum temperature, a larger output torque can be attained. Shimazaki

fails to discuss this concept or suggest using a selected temperature from a coil where a maximum current flow is detected as called for by claims 1 and 9.

3. Conclusion

As discussed above, the subject matter of independent claims 1 and 9 would not have been rendered obvious by the cited references. In addition, if an independent claim is not obvious under 35 U.S.C. §103(a), then any claim depending therefrom is also not obvious. For this additional reason, Appellant respectfully requests that the rejection be reversed.

VIII. CONCLUSION

For all of the reasons discussed above, it is respectfully submitted that the rejections are in error and that claims 1-16 are in condition for allowance. For all of the above reasons, Appellant respectfully requests that this Honorable Board reverse the rejections of claims 1-16.

Respectfully submitted,

James A. Oliff
Registration No. 27,075

Scott M. Schulte
Registration No. 44,325

JAO:SMS/lmf

OLIFF & BERRIDGE, PLC
P.O. Box 320850
Alexandria, Virginia 22320-4850
Telephone: (703) 836-6400

Filed: December 23, 2008

APPENDIX A - CLAIMS APPENDIX

CLAIMS INVOLVED IN THE APPEAL:

1. A control device of a vehicle motor with a plurality of coils, comprising:

a temperature sensor that detects a temperature of each coil of the plurality of coils, each coil supplying an alternating current to a corresponding phase of the motor; and

a controller that:

controls a torque of the vehicle motor;

detects a stalled state of a vehicle;

detects a current phase angle of the vehicle motor; and

selects one detected temperature detected by the temperature sensor, which is based on a detected current phase angle, wherein:

the torque of the vehicle motor is reduced when the stalled state of the vehicle is detected and when a selected temperature exceeds a restrictive temperature, and

the selected temperature is from a coil of the plurality of coils where a maximum current flow is detected, with the maximum current flow being detected based on the detected current phase angle.

2. The control device of the vehicle motor according to Claim 1, wherein the controller selects a phase of the vehicle motor as a detected phase when a temperature of the phase is within a predetermined range where the maximum current flows in the phase.

3. The control device of the vehicle motor according to Claim 2, wherein the current phase angle is determined based on a rotational angle of the motor.

4. The control device of the vehicle motor according to Claim 1, wherein the current phase angle is determined based on a rotational angle of the motor.

5. The control device of the vehicle motor according to Claim 1, wherein the controller selects a phase of the motor as a detected phase when the detected current phase angle is within a predetermined range.

6. The control device of the vehicle motor according to Claim 5, wherein the controller reduces the torque of the vehicle motor for each phase until a temperature of each phase exceeds the restrictive temperature.

7. The control device of the vehicle motor according to Claim 1, wherein the controller reduces the torque of the vehicle motor for each phase until a temperature of each phase exceeds the restrictive temperature.

8. The control device of the vehicle motor according to Claim 1, wherein when the stalled state of the vehicle occurs outside a predetermined range of each phase, a phase having a maximum temperature is selected.

9. A method of operating a vehicle motor with a plurality of coils, comprising:

detecting a temperature of each coil of the plurality of coils, each coil supplying an alternating current to a corresponding phase of the motor;

controlling a torque of the vehicle motor;

detecting a stalled state of a vehicle;

detecting a current phase angle of the vehicle motor; and

selecting one detected temperature based on a detected current phase angle, wherein:

the torque of the vehicle motor is reduced when the stalled state of the vehicle is detected and when a selected temperature exceeds a restrictive temperature, and

the selected temperature is from a coil of the plurality of coils where a maximum current flow is detected, with the maximum current flow being detected based on the detected current phase angle.

10. The method according to Claim 9, wherein a phase of the vehicle motor is selected as a detected phase when a temperature of the phase is within a predetermined range where the maximum current flows in the phase.

11. The method according to Claim 10, wherein the current phase angle is determined based on a rotational angle of the motor.

12. The method according to Claim 9, wherein the current phase angle is determined based on a rotational angle of the motor.

13. The method according to Claim 9, wherein a phase of the motor is selected as a detected phase when the detected current phase angle is within a predetermined range.

14. The method according to Claim 13, wherein the torque of the vehicle motor is reduced for each phase until a temperature of each phase exceeds the restrictive temperature.

15. The method according to Claim 9, wherein the torque of the vehicle motor is reduced for each phase until a temperature of each phase exceeds the restrictive temperature.

16. The method according to Claim 9, wherein when the stalled state of the vehicle occurs outside a predetermined range of each phase, a phase having a maximum temperature is selected.

APPENDIX B - EVIDENCE APPENDIX

NONE

APPENDIX C - RELATED PROCEEDINGS APPENDIX

NONE